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capable of verification in the sense that science must be. The former must minister to the instinct for the beautiful, and must do so by eliminating the accessories and selecting the relations which fit that instinct, while science must deal with the world of fact and ascertain its constitution. Both are selective. Both idealize their world. But while science seeks its verification in the world of existence, art seeks its verification in the growing meaning and unity of human attitudes.

Metaphysics is simply the attempt to find out the truth about reality—not the truth for a certain purpose merely, but what we finally must think about our world. Reality is non-communicative sometimes, like a man who refuses to be interviewed—well, then like the reporter, we have to write up what we think about it from such external marks and probabilities as we can find, not what it thinks. In any case, philosophy, like the enterprising newspaper, has to get out a good many editions to keep up with the procession of history.

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ART AND NATURE

A WATERFALL is a thing of natural beauty; artistic beauty is attributed to the painting of a waterfall. The cross-section of a tree which has been felled in the forest reveals the grain in variegated concentric lines: Is this natural or artistic beauty? Where does landscape gardening belong: Is it nature or art? At what point do the pile of building materials and the plan in the architect's mind become architecture? "A child talks to us with grace in her movements and sweetness in her voice, and we admire what we term her artlessness. A grown woman, an actress perhaps, produces almost identical effects that seem equally pleasing, but we admire in her what we term her art."

I

It was the belief of Plato that real beauty is original, pure, and perfect, while natural beauty and artistic beauty are derived and tainted with imperfection. He regarded the objects both of nature and of art as poor reproductions of an absolute reality abiding in the realm of what he called ideas or archetypal forms. Phenomenal things are but the unreal ephemeral embodiments of eternal meanings or concepts, and the representations of the artist and artisan, while aiming to grasp the essential significance of these universal types, as well as the phenomenal objects, turn out to be, at their best, but copies twice removed from the real. While he does not clearly state the issue between natural and artistic beauty, yet his doctrine of

the non-being of the world of space and time implies that both nature and art (which, for him, includes what we call industrial and fine art) are doomed to inferiority because of their necessarily derived and secondary character. Albeit, both are derived, yet natural beauty, being but one remove from the real, is prior and superior to artistic beauty.

The teaching of Aristotle is an advance upon that of his great predecessor. He redeemed the situation so far as to suggest that art supplies the deficiencies of nature and by the free play of imagery characteristic of artistic creation perfects and even transcends the aims which nature in her ordinary processes is striving to actualize. Here is an implication that natural and artistic beauty are equally real, but that the latter is the fruition of the former. For the Stagirite art is an imitation of nature and "imitation" still has much of the Platonic meaning that the artistic representation is inevitably inferior to the reality represented, but that he does not mean a mere transcript is shown by the fact that he says that the artist may "imitate things *as they ought to be*." Fine art, for Aristotle, never became symbolic, as in modern times; it always strives to be a likeness of the original, as when he conceives of drama as the portrayal of human emotion and action. But he verges toward the modern view in his theory of poetry (the highest form of art, for him), when he says that verse, as an expression of the universal element in human life, seeks to portray the ideal by getting rid of all contradictions and disturbing irrelevancies. A work of art, he says, is an idealized representation of human life under forms manifest to sense. Art here becomes a creative act which, as Professor Butcher says, "resolves itself into an effort to complete in some sense the work of nature."

The modern theory in general presents a striking contrast to that of the Greeks, yet we find Kant saying that art must turn to nature for her cue. "Beautiful art is art in so far as it seems like nature." Art must have the form of purposiveness without expressing any particular purpose; it must be significant in general without being specifically so. Or, as he puts it, "That is beautiful which pleases in the mere act of judging it"—not for the gratification it gives nor for any definite use, but just for its own sake. "Hence the purposiveness in the production of beautiful art, although it is designed, must not seem to be designed; beautiful art must look like nature, although we are conscious of it as art." "Genius," he adds, "is the talent (or natural gift) which gives the rule to art. Since talent, as the innate productive faculty of the artist, belongs itself to nature, we may express the matter thus: Genius is the

innate mental disposition through which nature gives the rule to art."

Ruskin, too, was a champion of the return of art to nature as the source of all beauty, his theory coinciding with that of Plato in so far as it maintained the priority and superiority of natural beauty. He affirmed that the attempt to copy nature is the origin of all art. The highest beauty is to be found in "nature undisfigured by man," in "virgin nature," because nature is only truly herself when nothing has been done to travesty or deface her. "Beauty," he says, "is the signature of God upon his works." If art would produce objects of beauty she must pattern upon the original. Nature alone possesses perfection; she is the supreme type and eternal model, whether it be "the leaf that fades and falls to the passing wind, the smallest pebble which rolls down from the mountain, or the frailest reed which bends over the water." All the most lovely forms and thoughts are taken directly from natural objects. "We lay it down as a first principle that our graphic art, whether painting or sculpture, is to produce something which shall look as like nature as possible."

Schiller's paradox that man is civilized only in proportion as he has learned to value the semblance above the reality is, however, much more characteristic of the modern point of view. To the romanticist, for example, art is the highest type of beauty since art is the product of the human mind and man is nature's crowning achievement. Natural beauty is contaminated by the concrete forms in which it appears. The highest beauty is the beauty of ideas or meanings which in art struggle to free themselves from their sensuous embodiment. Poetry, on this account, is the highest of the arts, because here meaning emerges in its most untrammelled form. Beauty undergoes an actual transformation in passing through the human mind and becomes charged with a significance that the deepest insight would never find in nature.

Hegel relegates natural beauty to an inferior position, since on his theory, all beauty is derived ultimately from the idea, the meaning, of the object in its relation to the total world-process. The concrete and sensuous husk in which all natural beauty comes to us obscures and defiles its pure essential import. The core and substance of beauty lie in the depth and wealth of significance which are revealed in the ideal as opposed to the sensible world. Nature is Spirit in a swoon, a trance, a sleep, as it were—still unconscious, unawakened. "The natural object is inferior to the art-product because, unlike the latter, it has not been born—born again, that is, of mind."

Mr. Bosanquet who writes the history of romanticism, following

up the Hegelian idea, finds the differentia of natural and artistic beauty in the degree of sophistication. Nature is the world as it exists for the untrained perception of the average man, whereas art implies the culture and expertness which come by knowledge and trained insight—a view similar to that of Taine, who held that the artist is superior to his model, disentangling nature and reinterpreting her according to his own ideas.

II

The difficulty of reconciling these opposed views which find beauty respectively in the objective world of nature and in the subjective world of human nature, suggests that beauty lies in neither taken alone, but in certain relation of the two. Beauty may be a continuous creation through the interaction of subject and object, the dualism of nature and art falling within the evolving content of reality instead of implying a relation of man's mind to an external object lying outside his consciousness. If reality be defined as the content of evolution, it is obvious that beauty may be conceived, not merely in terms of the object-matter, but also in terms of the method of experience. Goethe hints at a new point of view in certain of his aphorisms: Art is the truth of nature. Mere nature is an unreal abstraction. Nature and idea can not be separated without destroying art as well as life. When artists speak of nature, Idea is always understood, without their being clearly conscious of it. That very thing which strikes the uncultivated as nature, in a work of art, is not nature (outward) but man (inward nature). We know no world but in relation to man; we will have no art except it be an expression of this relation.

If the model and the artist, nature and human nature, are thus intimately bound together, we are to conceive of art and the artist, not as the medium of carrying an outside reality into experience, but as the instruments of evolving a reality which is the immanent content of that experience. Art is not merely revelatory. It itself is but a phase of the real; it is the reality of nature undergoing transformation in terms of human nature; it is the principle of relevancy and adequacy by which man's industry and science give a propitious form to natural objects and events. "Nature is made better by no mean. But nature makes that mean; so o'er that art which you say adds to nature is an art that nature makes."

The true antithesis is not between nature and art, but between subhuman and human nature. In this sense it is clear that in certain spheres art has transcended anything of beauty which we find in nature below man. Artistic beauty implies design, manipulation,

mediation; it selects and arranges with reference to the needs of man; it generalizes and idealizes underlying patterns and types. "From the moment the artist lays his hand upon any natural object," says Goethe, "that object no longer belongs to nature, nay, it may be said that the artist at that moment creates it, since he appropriates the significant, the characteristic, the interesting, that he finds in it, or rather breathes into it a higher value."

But nature as she appears even to the ordinary perception of the average man is only relatively unmediated, since even the so-called natural phenomena are really perceived only as they are apperceived. There is no absolutely virgin nature, no utterly unspoiled presentation. If the differentia of art lies in the manipulation of the material presented by nature, then the felled tree or the log sawed across in such a way as to reveal the grain may be as truly art, in principle, as the polished quartered oak. And why not go a step further back and admit that when the artist looks at a tree he mediates it as truly as when he fells it to the ground and fashions it into a table?

Art is nature humanized. Man's "habits and pursuits leave their mark on whatever he touches," says Professor Santayana. "When absorbed in the beauty of nature we do in fact appear to ourselves to be entirely receptive," says Mr. Hirn, "but in truth our enjoyment, if the enjoyment has any esthetic value at all, is always more or less derived from the activity of our own mind." Any product of fine art may be regarded from the point of view of natural beauty, if we extend nature to include human nature, while nature herself may be regarded as a work of art if we take into account the human manipulations and transformations involved in any act of sense-perception. There is no difference in an ultimate analysis between natural and artistic beauty, since all art must, in the broad sense of the term, be naturally produced, and the crudest perception of beauty by the lowest intelligence involves the creative participation of the percipient.

The distinction between natural and artistic beauty retains a certain value for descriptive purposes, but logically it reduces to a relative difference in mediation. The distinction arises and is of utility solely in relation to the recording and making socially accessible of certain forms of beauty which are then called artistic in contrast with others which have not been thus socialized. Artistic beauty is natural beauty given social embodiment. The difference between art and nature is science. Art is nature becoming "second nature" through the instrumentality of industrial and scientific metamorphosis of its materials. The deliberation and mediation which Hegel and Bonsanquet attribute to art are more properly ascribed to the science by which art has so largely profited and upon

which she has been so constantly dependent for the perfection of her technique.

The true differentia, in other words, is to be found in the purpose of the artist or esthete—as representing a distinct type of human interest and occupation. What is “style” in a work of art but that peculiar form which nature takes in and through its special manifestation in this particular artist and under certain local and temporal conditions? When we demand that a work of art shall be true to nature, all depends upon what aspect of nature is in mind: the expressed purpose (human nature) or the materials (nature) which are the medium of expression. Truth to nature means truth to the law of the process by which she at this moment and here in this artist is evolving; it includes what nature is becoming in man, and in this individual man, as truly as what she is apart from man. In this sense, appreciation may be said to be the keynote of natural beauty; production, of artistic beauty. That is to say, natural beauty is beauty appreciated in terms of the purely personal technique, the sensorimotor adjustments involved in any trained perception; artistic beauty is appreciated in terms of some form of extra-organic, objective, so-called impersonal technique, some phase of the socialized professional method of the artist. Natural and artistic beauty therefore overlap in the case of the appreciator who is also somewhat of an artist.

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NOTE ON A QUANTITATIVE ANALYSIS OF MATHEMATICAL INTELLIGENCE¹

THE following is a brief summary of the results obtained by an application of the theory of correlation to the analysis of elementary mathematical intelligence, according to the scheme suggested in this JOURNAL.²

A set of 83 boys from the five middle forms of an English public school were examined on three mathematical papers (geometry, arithmetic, and algebra), their answers being marked according to a differential system of marking, under the following heads:

A. Memory of definitions and general principles (*e. g.*, principle of superposition) in geometry.

B. Memory of constructions (geometry).

C. Memory of preceding propositions and power of applying them (geometry).

¹ For a further account of the results here described see *Biometrika*, Vol. VII., part 3.

² See Vol. VII., p. 14.